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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/137,084	08/20/1998	MICHAEL F. STUMBORG	79329	2479

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EXAMINER
VU, HUNG K

ART UNIT	PAPER NUMBER
2811	35

DATE MAILED: 07/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/137,084	STUMBORG ET AL.	
	Examiner	Art Unit	
	Hung K. Vu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 21-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *26,33* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-13, 21 and 23-28 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 respectively, of U.S. Patent No. 6,465,887. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-13, 21 and 23-28 are generic to claims 1-13 of U.S. Patent No. 6,465,887. The claimed invention (claims 1-13, 21 and 23-28) of the present application is a

mere broader version of the claimed invention (claims 1-13) of the above identified U.S. Patent with similar intended scope, thus allowing unjustified or improper timewise extension of the "right to exclude" granted by a U.S. Patent No. 6,465,887.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 21 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (JP6-164004, of record).

Suzuki et al. discloses, as shown in Figure 5, a semiconductor device comprising,

a substrate (5);

a barrier film (6) having a monolayer of elemental barium atoms on the substrate;

a metallic material (9) directly on the barrier film.

With regard to claim 21, Suzuki et al. discloses the barrier film comprises a plurality of contiguous monolayers of barium atoms located on a surface of the substrate.

With regard to claim 27, Suzuki et al. discloses the substrate comprises semiconductor silicon, and the barrier film directly contacts the substrate.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 6-13 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP6-164004, of record).

Suzuki et al. discloses, as shown in Figure 5, a semiconductor device comprising,

a substrate material (5) having a surface;

a barrier film (6) in direct contact with the substrate surface, the barrier film having a layer comprising elemental barium atoms on the surface;

a conductor (9) directly on the barrier film, the conductor having a tendency to diffuse into the semiconductor substrate material if in direct contact therewith; and wherein the elemental barium atoms are between the conductor and the semiconductor substrate such that the layer serves as a barrier, inhibiting diffusion of the conductor into the semiconductor substrate material.

Although Suzuki et al. do not explicitly disclose a conductor having a tendency to diffuse into the substrate if in direct contact, it is well known in the art the metal conductors have tendency to diffuse into a semiconductor substrate.

With regard to claim 6, Suzuki et al. discloses the barrier film is a single monolayer of barium atoms attached to the surface of the substrate material.

With regard to claim 7, Suzuki et al. discloses the barrier film comprises a plurality of contiguous monolayers of barium atoms located on a surface of the substrate.

With regard to claims 8 and 9, Suzuki et al. discloses the substrate comprises semiconductor silicon.

With regard to claims 10-11 and 13, Suzuki et al. discloses all of the claimed limitations except the conductor comprising copper and the substrate is an insulating material and silicon oxide. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Suzuki et al. having the materials as that claimed by Applicants, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

With regard to claim 12, Suzuki et al. discloses the conductor is a metal.

4. Claims 3-5 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP6-164004, of record) in view of Aruga (PN 5,877,086, of record).
Suzuki et al. do not disclose the thickness of the barrier layer. However, Aruga discloses using a barrier layer having a thickness in the range of approximately 5 to 100 (Col. 4, line 66 to Col. 5, line 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to form the barrier of Suzuki et al. having a thickness in the range of approximately 5 to 100, such as taught by Aruga in order to reduce the size of the device. Note that Applicants must show that a particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.

Response to Arguments

5. Applicant's arguments filed 04/23/03 have been fully considered but they are not persuasive.

It is argued, at pages 2-5 of the Remarks, that Suzuki does not disclose a metallic material directly on the barrier film. This argument is not convincing because Suzuki discloses, as shown in Figure 5(d), a metallic material (9) directly on the barrier film (6). Note that the claimed language does not specifically state that the metallic material directly or physically contacts the barrier film, therefore, applicants' claims 1, 2 and 23 do not distinguish over the Suzuki reference.

It is argued, at page 5 of the Remarks, that Aruga does not disclose a metallic material directly on the barrier film. This argument is not convincing because the claimed language does not specifically state that the metallic material directly or physically contacts the barrier film. Further, the examiner combine the teaching of Aruga about the thickness of the barrier film into the Suzuki invention.

It is argued, at page 6 of the Remarks, that the rejection for non-statutory double patenting of Chu be withdrawn because Chu does not disclose the metallic layer is directly on the barrier layer. This argument is not convincing because the claimed language does not specifically state that the metallic material directly or physically contacts the barrier film.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-4:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

July 6, 2003

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER
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